Abstract—In order to solve the problem of sensor node localization of wireless sensor and actor networks, a range-based time of arrival (TOA) localization algorithm with virtual force and time synchronization (TLAVFTS) in WSAN is proposed in this paper, which uses mobile actors instead of WSN’s anchors, and combines TOA with virtual force on the premise of time synchronization. The algorithm completes node localization by driving the actor node under the action of virtual force, which makes them move close to the request of sensor node and calculating of the distance between nodes according to the signal transmission time. The simulation results show that the proposed algorithm can improve the success localization rate by up to 40% and also is superior to traditional TOA on the average localization time, error and overhead; it can apply to real-time filed with small number of actor nodes.

Index terms: WSAN; time synchronization; virtual force; TOA, TLAVFTS